

### NOTE

All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  [.005] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

## 1. INTRODUCTION

This specification covers requirements for the printed circuit (pc) board-to-board application of AMP\* Eurocard Connectors—Types B, C, M, Q, R, and Enhanced Type C. These two-piece, 2.54 [.100] row-to-row and in-row centerline contact connectors are designed to mate with all DIN 41612 and IEC 603-2 connectors of similar type and contact arrangement. The two- and three-row connectors are available in 32, 64, and 96 positions, as well as half sizes and expanded sizes as mating pin and receptacle connectors.

The housings are available pre-loaded with AMP ACTION PIN\* thin stock and square stock contacts (0.64 [.025]), solder tines and wrap-type contacts in various lengths. Type M housings have contact cavities at each end that will accept solder cup, coaxial crimp-type, and solder type contacts. Multiple pin heights for connectors with make first, break last (MFBL) contacts and selective contact loading are available.

When corresponding with AMP personnel, use the terminology provided in this specification to facilitate your inquiries for information. Basic terms and features of these components are provided in Figure 1.

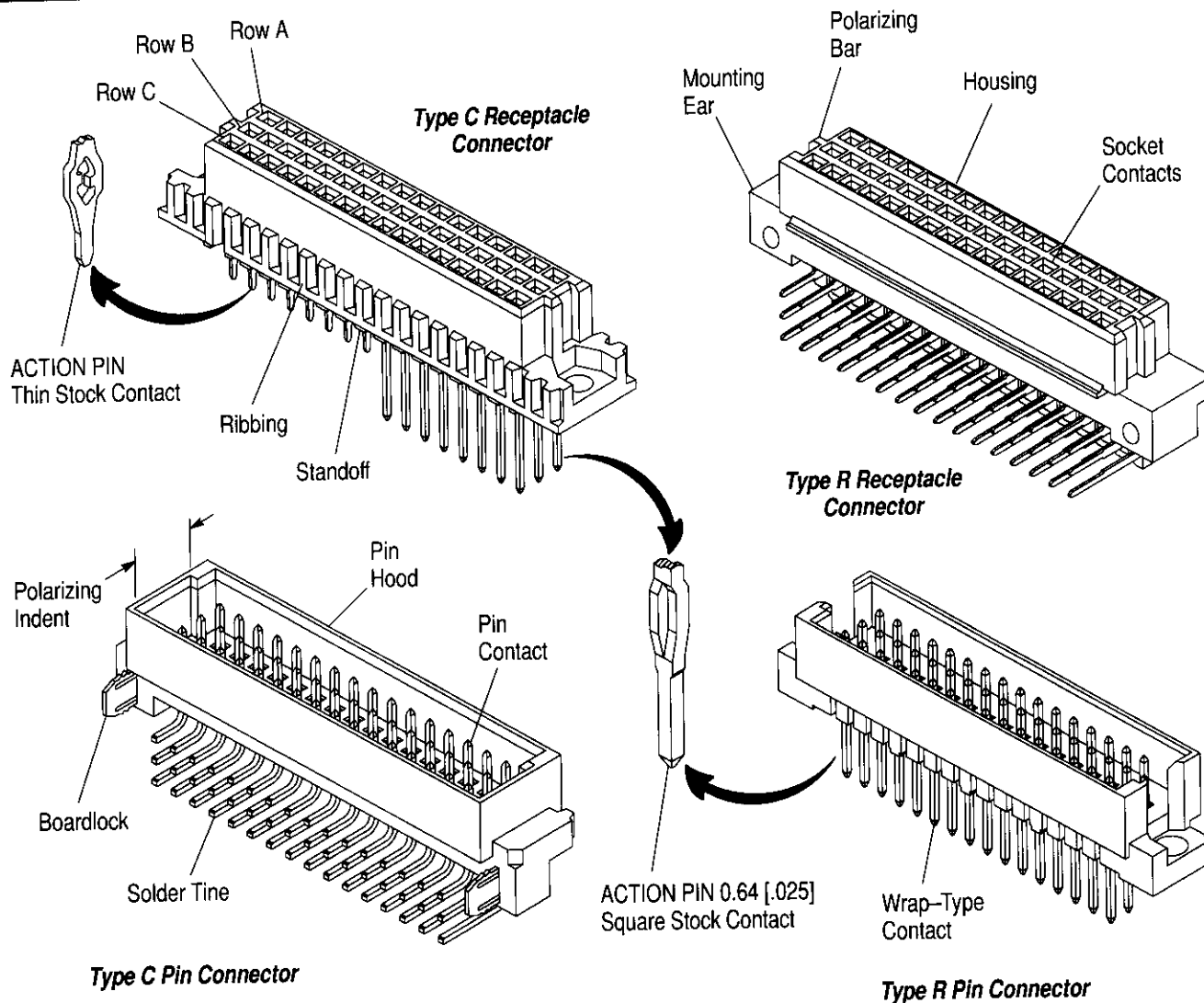


Figure 1 (Continued)

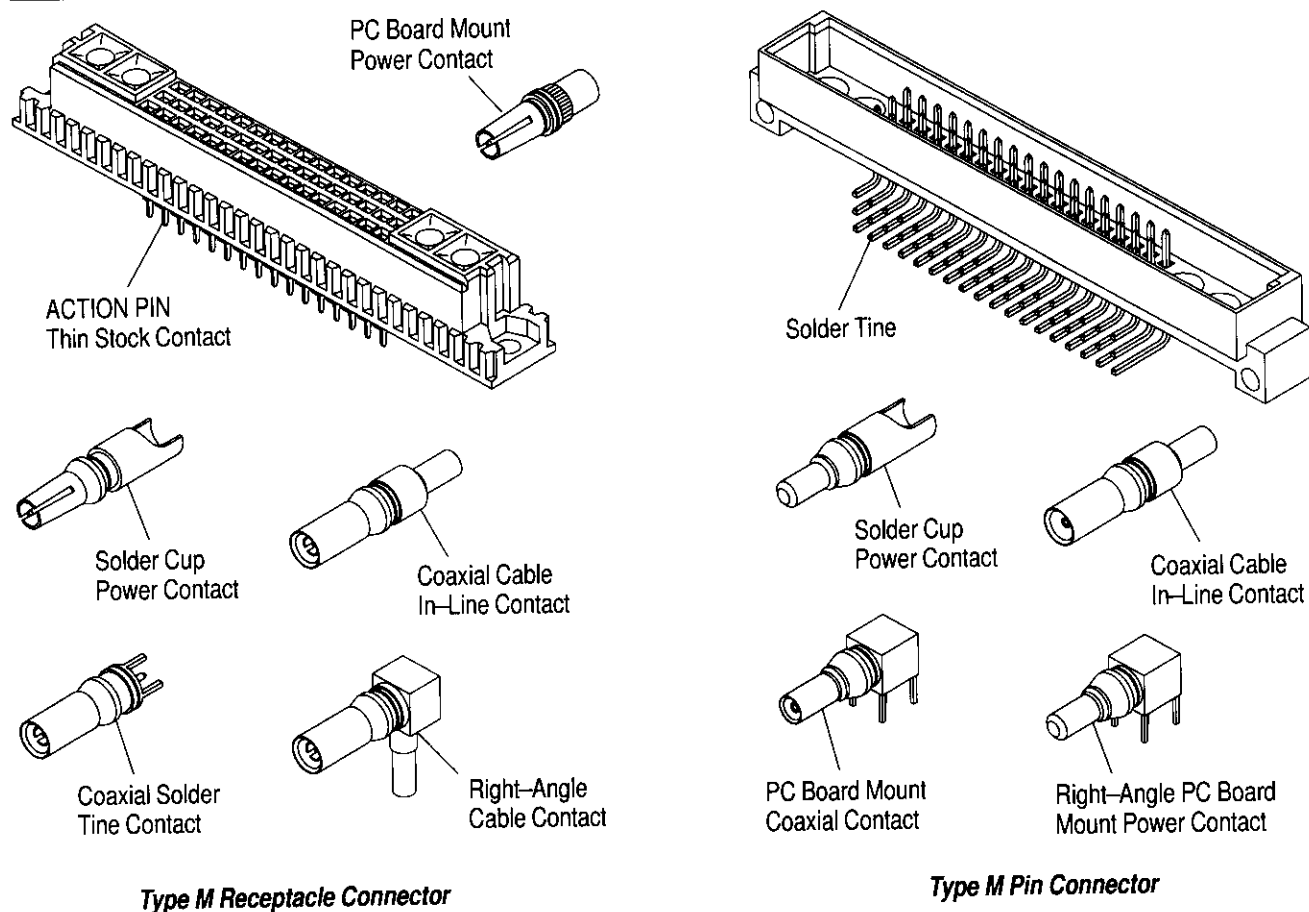


Figure 1 (End)

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

The following revision summary of changes and additions have been made to this specification for this revision.

Per EC 0990-0986-95:

- Added information for Type M connectors
- Removed "standard" and "inverse"
- Removed "tool-less type" and "requires tool" from Figure 1
- Added Paragraph 2.1, Revision Summary
- Removed 408-2636, 408-6975, 408-9052, 408-9185, 408-042-184, and Handbook 5697 from Paragraph 2.5
- Added 408-9027, 408-9894, 409-5567, 409-5626 to Paragraph 2.5
- Modified Figure 2
- Removed "or retention legs" from Paragraph 3.2,A
- Added Paragraph 3.2,B, Mounting Ears and Standoffs, and Figure 4
- Added Paragraph 3.5, Wrap-Type Contacts and Figure 6; and Paragraph 3.6, Ancillary Items and Figure 7
- Modified Figure 9 (connector seating)
- Removed "1,1,1-Trichlorethane" from 3.8,B and added list of approved cleaners (Figure 12)
- Modified information in Paragraph 3.9, Repair
- Added machine part numbers and documents to Figure 13
- Added Seating Tool 148090-[ ] to Figure 15

- Changed “tool-less” to “no special tooling required”
- Removed Seating Tools 535072-1 and 58171-[ ]
- Replaced back-up block for pin connector with support block for both pin and receptacle connector in Paragraph 5.5 and Figure 16
- Added Paragraph 5.6, Contact Extraction Tooling
- Added Extraction Tool 106242-1 to Figure 16
- Modified Figure 17, Visual Aid

## **2.2. Customer Assistance**

Product Part Number 535032 and Product Code 5607 are representative of AMP Eurocard Connectors. Use of these numbers will identify the product line and expedite your inquiries through an AMP service network established to help you obtain product and tooling information. Such information can be obtained through a local AMP Representative (Field Service Engineer, Field Applications Engineer, etc.) or, after purchase, by calling the Tooling Assistance Center number at the bottom of page 1.

## **2.3. Drawings**

AMP Customer Drawings for product part numbers are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any other technical documentation supplied by AMP Incorporated.

## **2.4. Specifications**

AMP Product Specification 108-26003 provides information for ACTION PIN contacts. Product Specification 108-5299 contains information for ACTION PIN contacts and solder type contacts for Type Q connectors.

## **2.5. Instructional Material**

AMP instruction sheets (408-series) and customer manuals (409-series) contain detailed assembly instructions and repair procedures for product and tooling. Documents available which pertain to Eurocard connectors are:

408-6927	Design Recommendations for Printed Circuit Board Support Fixture
408-9027	Adapter Kit for Greenerd Frame Assembly
408-9623	Seating Tool 535072-1 (for Type C Receptacle Connectors and Seating Tool 148090-[ ] for Type M Receptacle Connectors)
408-9740	Seating Tools 768211-[ ] (for Type R Connectors with ACTION PIN Contacts)
408-9894	Programmable Seating Tools 768216-[ ] (for Type R Connectors with MFBL Contacts)
409-5567	“H” Frame Power Unit Machine 803880-6
409-5626	SM-3 Machine 814700-2

## **2.6. Bulletins**

AMP Corporate Bulletin 52 is available upon request and can be used as a guide to soldering. This bulletin provides information on various flux types and characteristics with the commercial designation and flux removal procedures. A checklist is attached to the bulletin as a guide for information on soldering problems.

# **3. REQUIREMENTS**

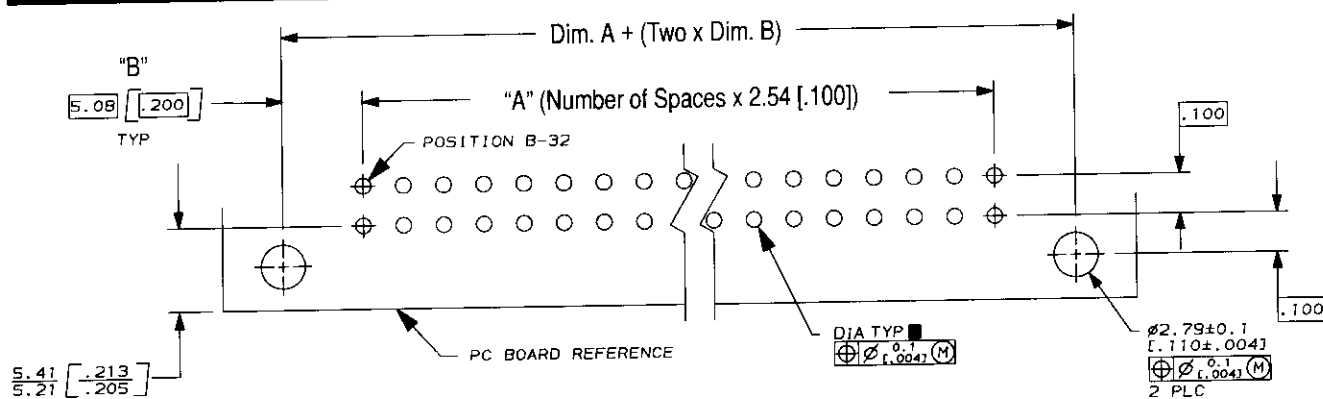
## **3.1. PC Board**

### **A. Thickness**

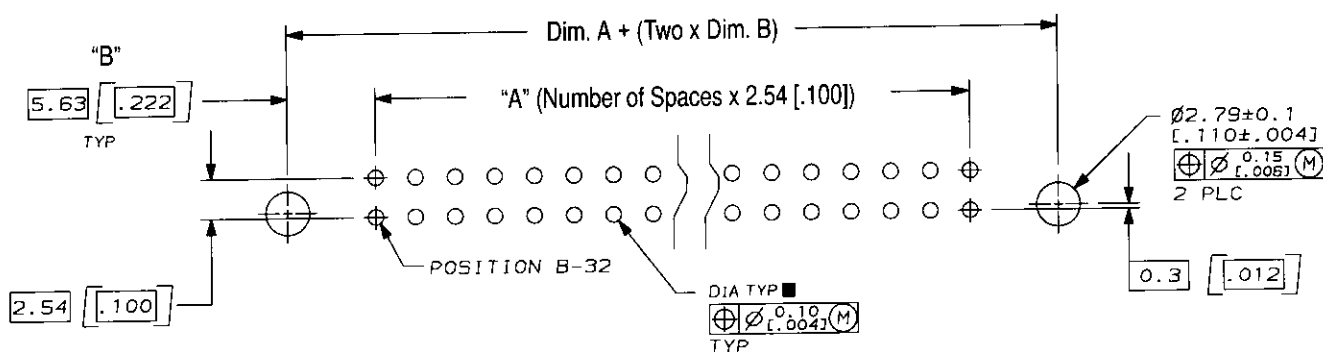
1. Connectors with ACTION PIN contacts are available in two designs: one for pc boards with a minimum thickness of 1.57 [.062] and one for pc boards with a minimum thickness 2.36 [.093].
2. Connectors with solder tines or ACTION PIN thin stock contacts require a minimum pc board thickness of 1.57 [.062].

### **B. Layout**

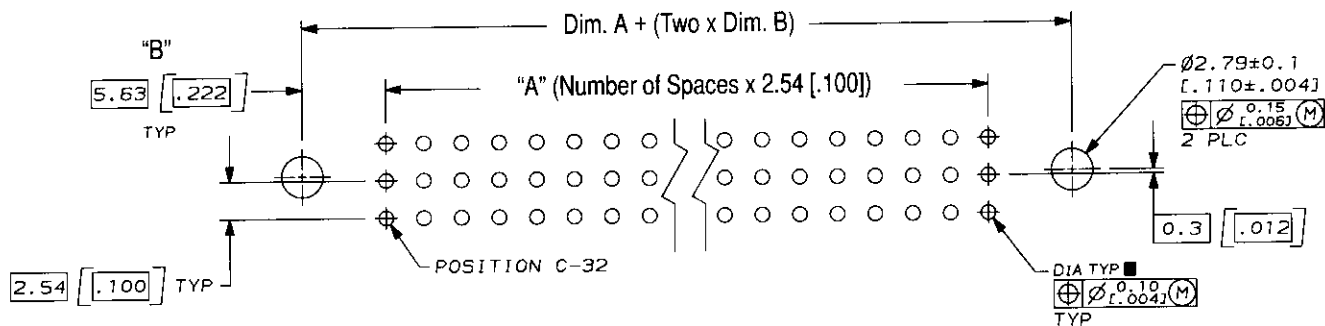
The suggested pc board layout should be as specified in Figure 2.



**Type B Pin Connector and Type Q Receptacle Connector**



**Type Q Pin Connector and Type B Receptacle Connector**



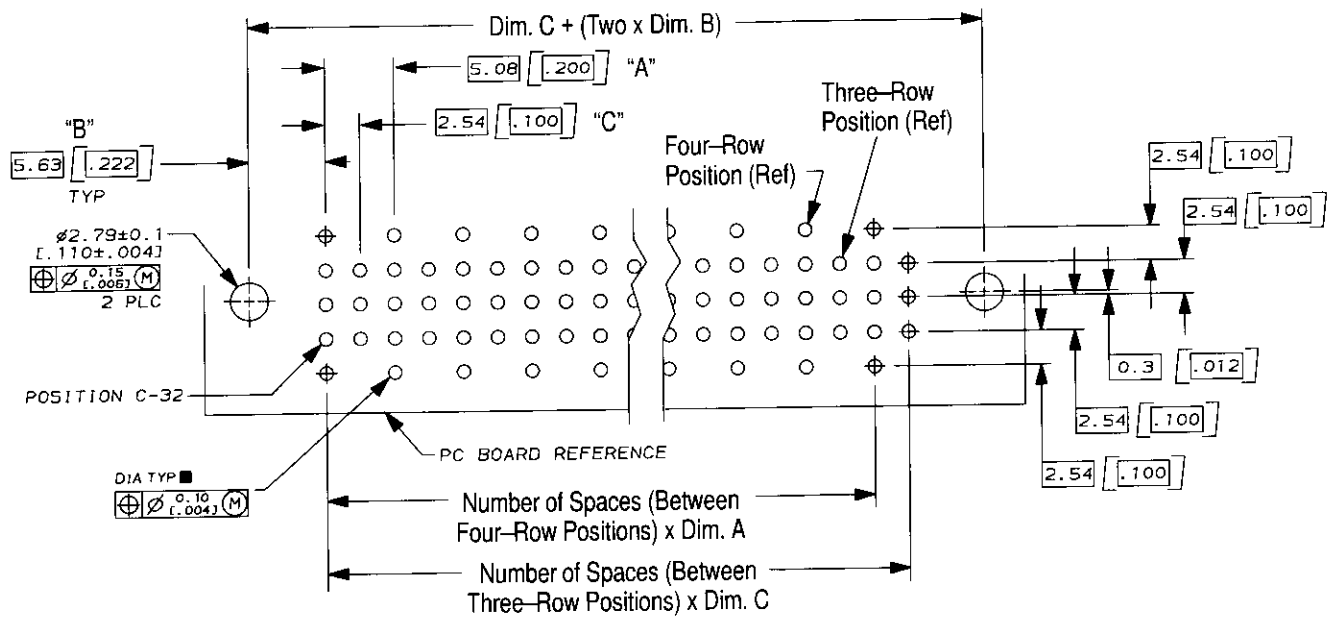
**Type R Pin Connector and Type C Receptacle Connector**

■ See Figure 3

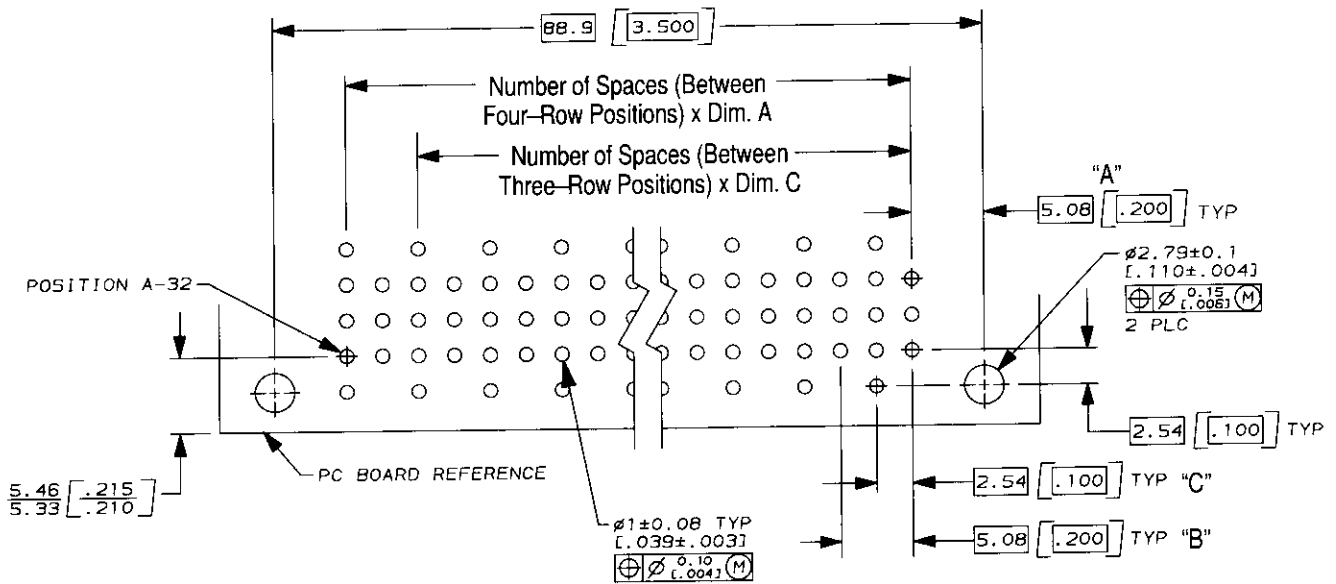
Figure 2 (Continued)



Figure 2 (Continued)



**Enhanced Type C Receptacle Connector**



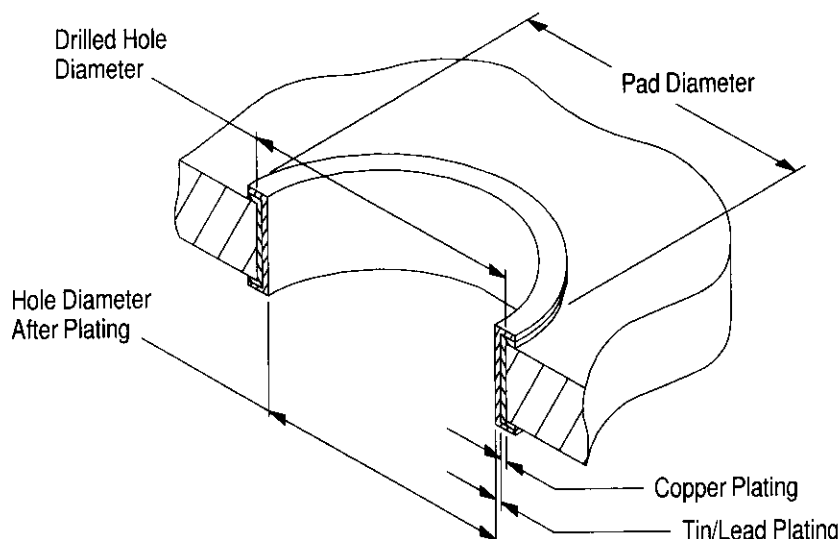
**Enhanced Type C Pin Connector**

■ See Figure 3

**Figure 2 (End)**

**C. Hole Dimensions** (Figure 3)

Values specified in the following must be complied with to ensure proper performance. The drilled hole diameter and the copper plating thickness are of major importance and must be adhered to.



CONTACT TYPE	PC BOARD HOLE						PC BOARD PAD (Min Dia)
	TYPE	DIAMETER			PLATING THICKNESS		
		DRILLED	AFTER PLATING	AFTER REFLOW	COPPER (Knoop—150 Max)	TIN/LEAD (Min)	
ACTION PIN	Plated—Through	1.125–1.176 [.0443–.0463]	0.94–1.09 [.037–.043]	0.91–1.09 [.036–.043]	0.03–0.08 [.001–.003]	0.008 [.0003]	1.57 [.062]
	Plated—Through (Type Q)	0.874–0.925 [.0344–.0364]	0.75–0.85 [.030–.033]	—	0.03–0.08 [.001–.003]	0.008 [.0003]	1.57 [.062]
	Non—Plated— Through	1.125–1.176 [.0443–.0463]	—	—	—	—	1.65 [.065]
Solder Tine	Plated—Through	1.125–1.176 [.0443–.0463]	0.91–1.07 [.036–.042]	—	—	—	Hole Diameter Plus 0.51 [.020]

Figure 3

**3.2. Housing Features****A. Boardlocks**

The solder tine connectors are available with boardlocks which help retain the connector onto the pc board. Special application tooling or equipment is not required for connectors with boardlocks.

**B. Mounting Ears and Standoffs**

These connectors are designed with mounting ears in different thicknesses and spacing between standoffs. Those with larger mounting ear height and closer standoff spacing do not require a seating tool to push the ACTION PIN contacts through the pc board holes to seat the connector. Those with smaller mounting ear height and greater standoff spacing require the use of a seating tool. See Figure 4.

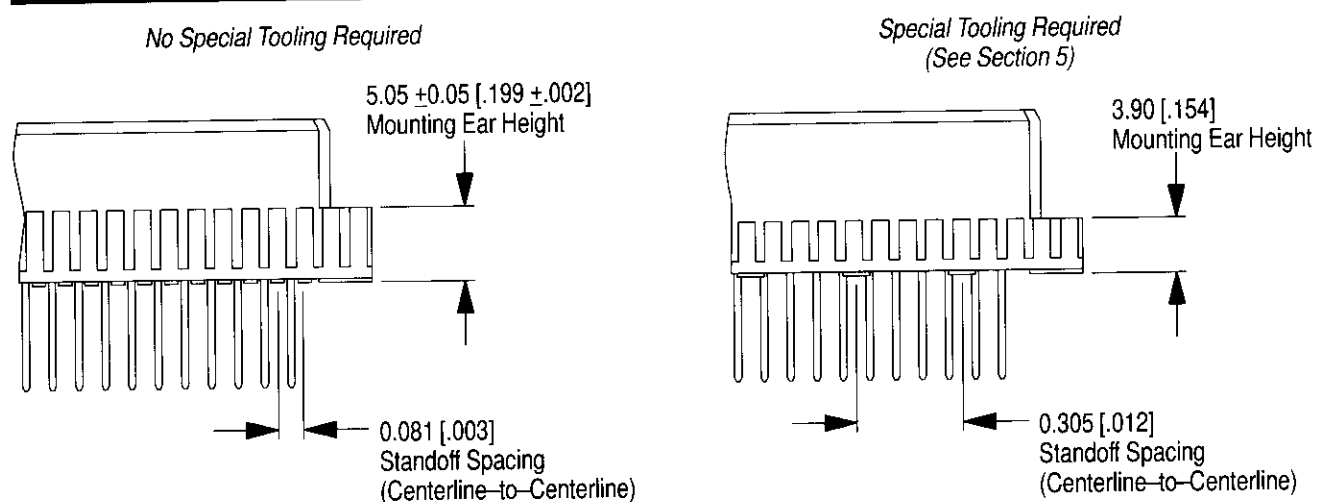


Figure 4

### 3.3. Mounting Hardware

Connectors are designed to be secured to the pc board with commercially available M2.5 mounting screws and nuts. See Figure 5.

### 3.4. Polarizing Feature and Keying

Each pin and receptacle connector has a polarizing bar and indent that ensures correct orientation for mating. When more than one pin and receptacle connector of the same configuration are used in an area, they can be keyed to prevent mis-mating. Keying strips and keying plugs are available. See Figure 5.

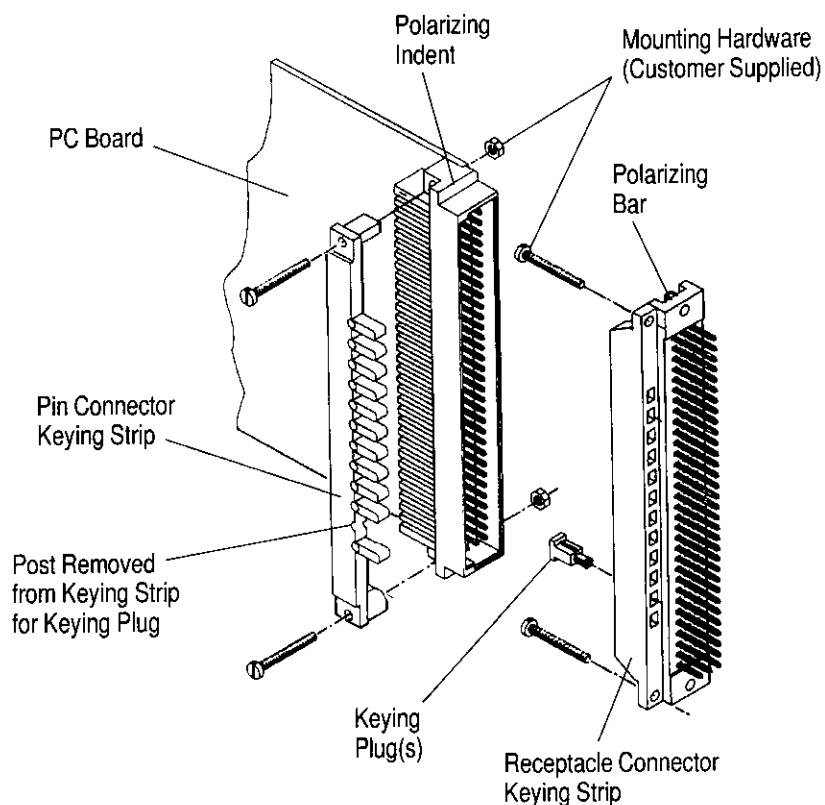


Figure 5



### 3.5. Wrap-Type Contacts

The wrap-type contacts available in these connectors will accommodate one or two wire wrap applications. It is recommended that 8 to 10 turns of solid wire be wrapped when using wire size 32 AWG, 7 to 9 turns when using wire size 30 or 28 AWG, and 6 to 7 turns when using wire size 26 AWG. The wire must be tightly wrapped to achieve reliable wrap-type terminations. See Figure 6.

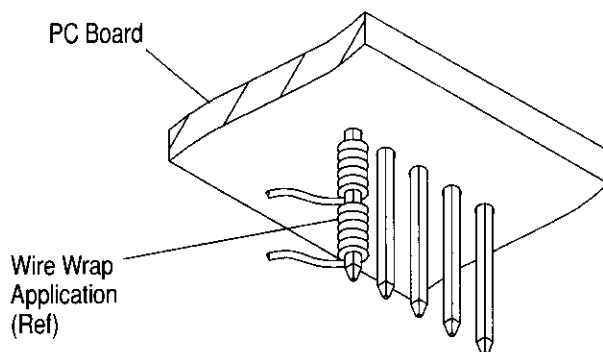


Figure 6

### 3.6. Ancillary Items

#### A. Guide Brackets

Various types of guide brackets have been designed for application to Type C connectors. The guide bracket is mounted onto the pc board to help properly guide the mating connector onto the pin or receptacle connector. The bracket is also designed to attach to the connector with the mounting screws and nuts supplied with the guide brackets to ensure a stable application. See Figure 7.

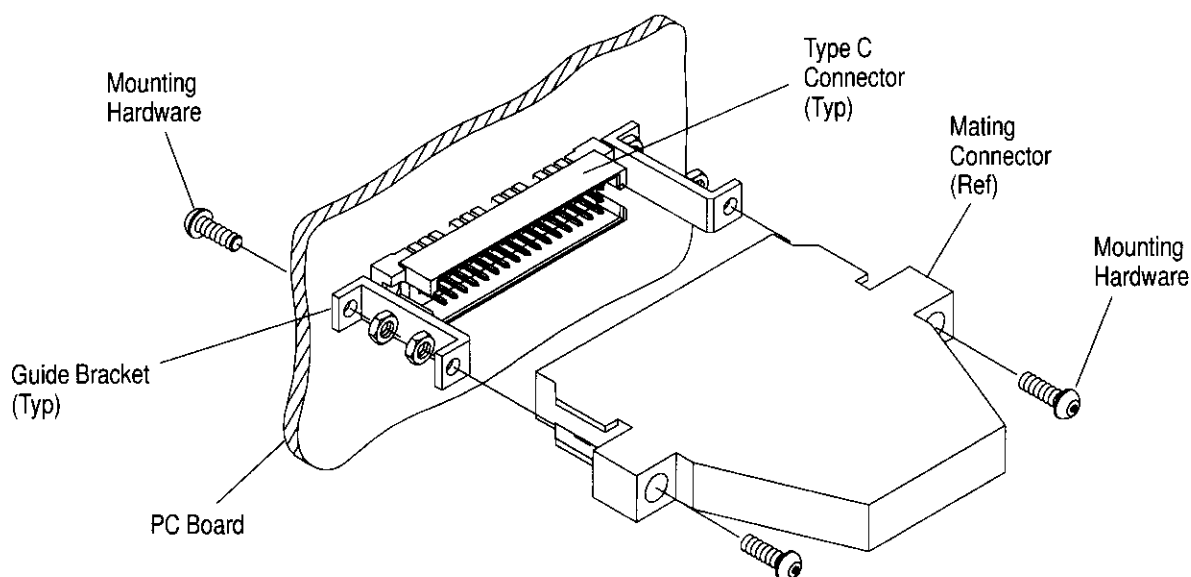


Figure 7

#### B. Dust Covers

Dust covers are used to protect the mating face of connectors that are not mated. The cover must be aligned with the mating face of the connector and pressed into position. The covers are available for Type C connectors 64- and 96-position. See Figure 8.

### C. Shrouds

Mating capabilities may be expanded by stacking connectors with the use of a shroud. Shrouds are used with all 48- and 96-position, three-row, Type C connectors and all 48- and 96-position, Type R connectors with ACTION PIN contacts mounted in pc boards with a thickness of 3.18 [.125], 2.36 [.093], and 1.57 [.062]. Shrouds must be selected according to size (contact positions) and height (contact length) and are applied manually. Refer to Figure 8.

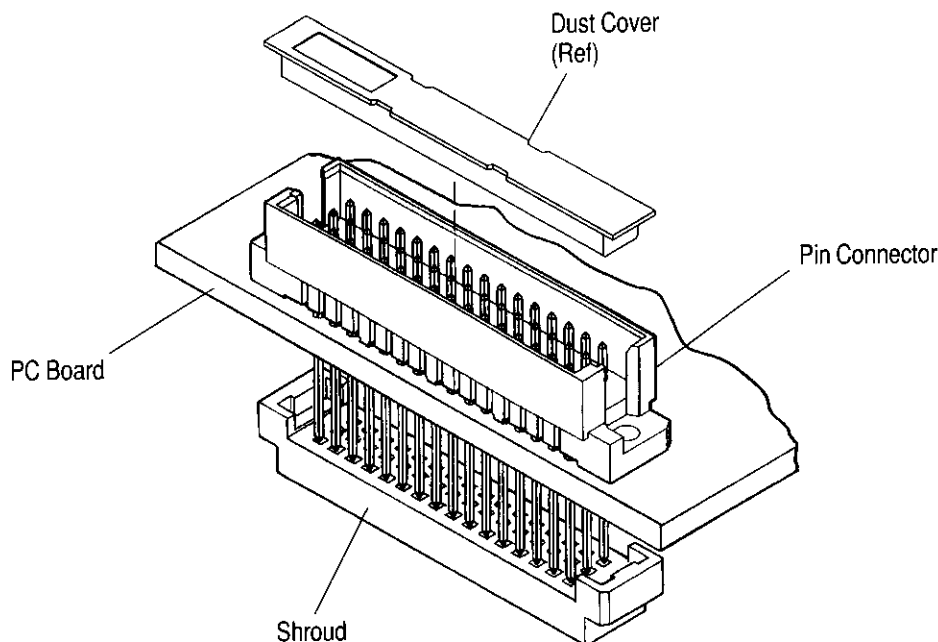


Figure 8

### 3.7. Mating and Alignment

#### A. Connector Seating

Seated connectors must be bottomed on the pc board, measured from the top of the connector standoffs to the pc board, to within the dimension shown in Figure 9.

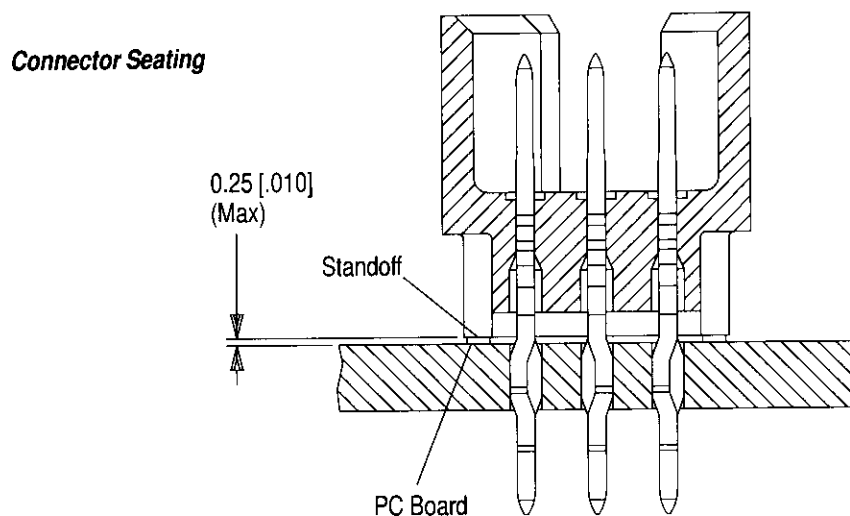


Figure 9

## B. Mating Dimensions

Possible mating configurations are illustrated in Figure 10.

### NOTE

The dimensions shown are for reference only when designing systems. Designated centerlines indicate mounting hole location. Refer to the applicable AMP customer drawing for connector dimensions.

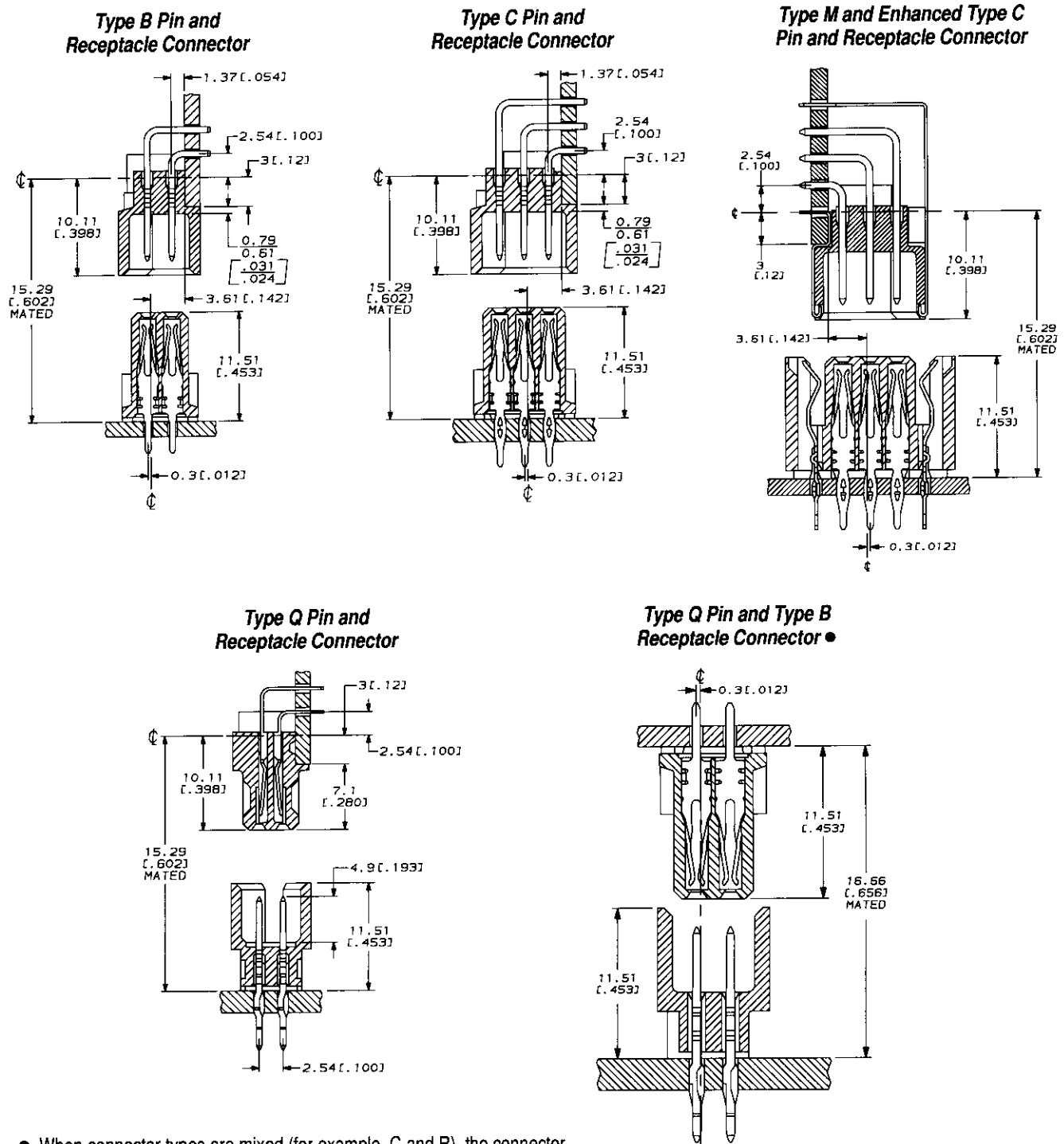
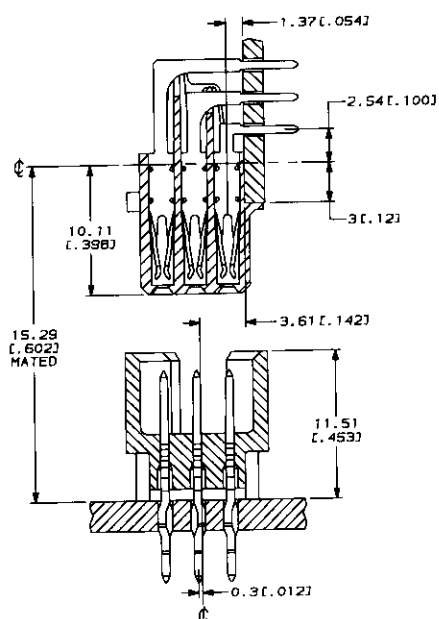
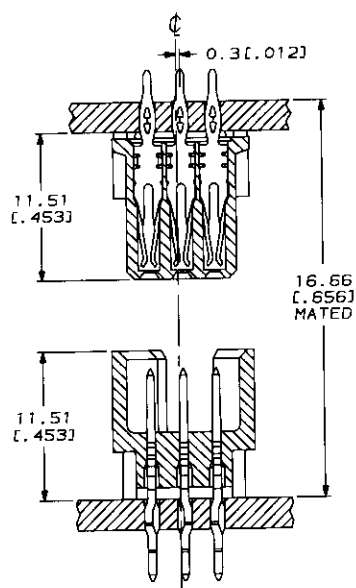


Figure 10 (Continued)

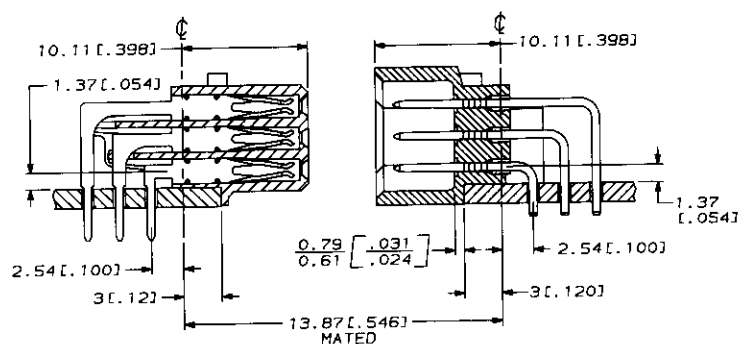
**Type R Pin and  
Receptacle Connector**



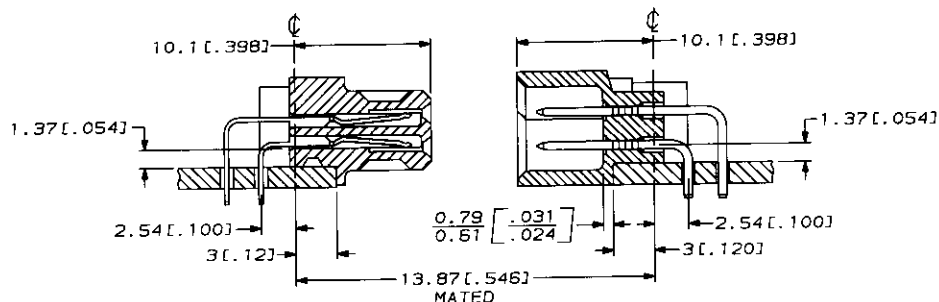
**Type R Pin and Type C  
Receptacle Connector**



**Type C Pin and Type R  
Receptacle Connector •**



**Type B Pin and Type Q  
Receptacle Connector •**



- When connector types are mixed (for example, C and R), the connector circuit numbers will not match; for example, Position A1 of the pin connector will mate with Position A32 of the receptacle connector.

Figure 10 (End)

### C. Mating Conditions

To ensure reliable connections and prevent unnecessary damage to connectors, refer to the recommended vertical alignment and offset tolerances shown in Figure 11.

**CAUTION**

*DISCONNECT electrical current before mating or unmating connectors.*

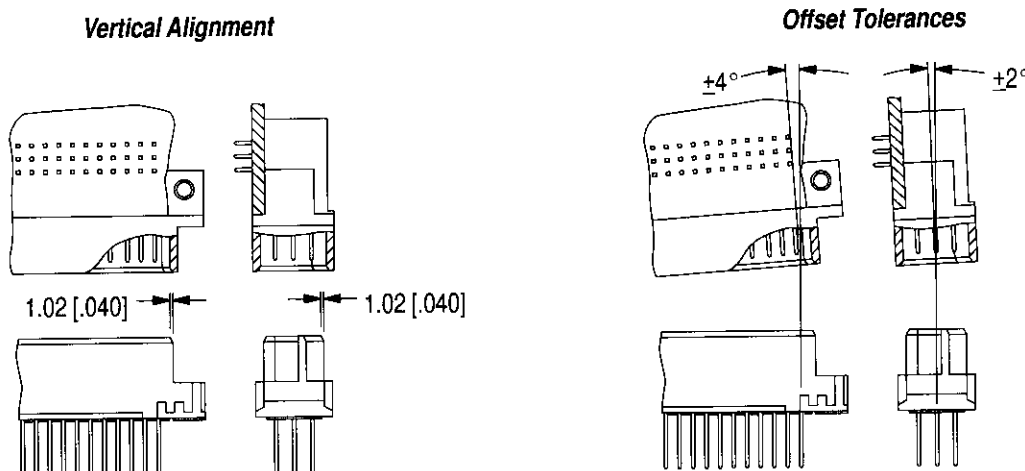


Figure 11

### 3.8. Soldering

Connectors with solder contacts can be mounted on and secured to a pc board by hand soldering or wave soldering techniques.

#### A. Flux Selection

Solder tines and pc board attaching hardware must be fluxed prior to soldering. Selection of the flux will depend on the type of pc board used and other components that may be mounted on the board. Also, the choice will have to be compatible with the wave solder line, manufacturing, and safety requirements.

#### B. Cleaning

Fluxes, residues, and activators must be removed. Cleaning procedures depend on the type of flux used on the solder line. The following cleaning compounds and chemicals may be used to clean the connectors without adverse affect on the housings and contacts.

CLEANER		TIME (Minutes)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
Alpha 2110■	Aqueous	1	132	270
Bioact EC-7◆	Solvent	5	100	212
Butyl Carbitol●	Solvent	1	Room Ambience	
Isopropyl Alcohol	Solvent	5	100	212
Kester 5778⚡	Aqueous	5	100	212
Kester 5779⚡	Aqueous	5	100	212
Loncoterge 520●	Aqueous	5	100	212
Loncoterge 530●	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

■ Product of Fry's Metals, Inc.    ◆ Product of Petroferm, Inc.    ● Product of Union Carbide Corp.    ⚡ Product of Litton Systems, Inc.

Figure 12

### DANGER

Consideration must be given to toxicity and safety requirements recommended on the Material Safety Data Sheet furnished by the solvent manufacturer.

### NOTE

If you have a particular solvent that is not listed, consult an AMP representative before using it on these connectors.

### C. Drying

When drying cleaned components and pc boards, make certain the temperature limitations of  $-55^{\circ}$  to  $125^{\circ}\text{C}$  [ $-70^{\circ}$  to  $260^{\circ}\text{F}$ ] are not exceeded.

### D. Soldering Guidelines

Refer to Paragraph 2.6 of this specification for instructional material that is available for establishing soldering guidelines.

### CAUTION

Protect lower shroud (vertical connectors) or lower ground plane (enhanced connector) when soldering right-angle pin connectors.

### 3.9. Repair

In the event of damaged contacts or connector, the entire connector must be replaced with a new one, with the exception of the coaxial contacts in Type M connectors which are removable (refer to Paragraph 5.6).

## 4. QUALIFYING SUPPORT

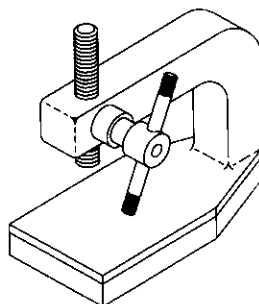
Eurocard Connectors meet DIN 41612 and IEC 603-2 specifications. The connectors are also certified by Canadian Standards Association (CSA) File LR7189 and recognized under the Component Program of Underwriters' Laboratories, Inc. (UL) File E28476.

## 5. TOOLING

### 5.1. Application Tooling

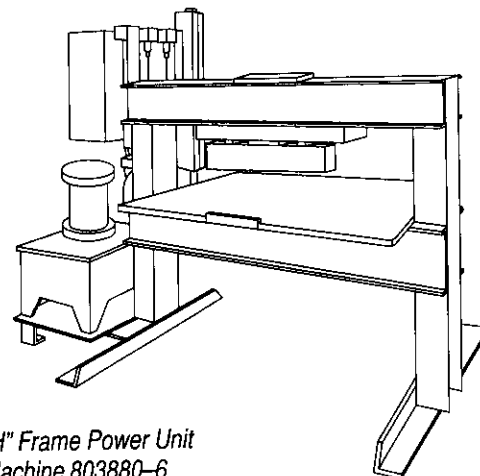
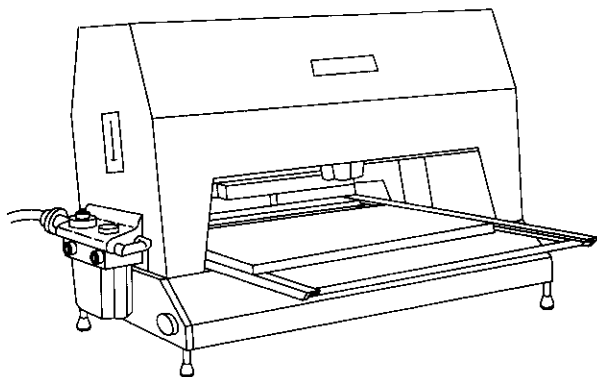
For low-volume manufacturing, an arbor frame type applicator may be used; for high-volume manufacturing, machine application is recommended. See Figure 13.

Power Units



Typical Arbor Frame Press  
(Such as Greenerd 3A or 3B  
Manual Frame Assembly—refer  
to 408-9027 for AMP Adapter  
Kit when using this type press)

SM-3 Machine 814700-2  
(409-5626)



"H" Frame Power Unit  
Machine 803880-6  
(409-5567)

Figure 13

## 5.2. PC Board Support

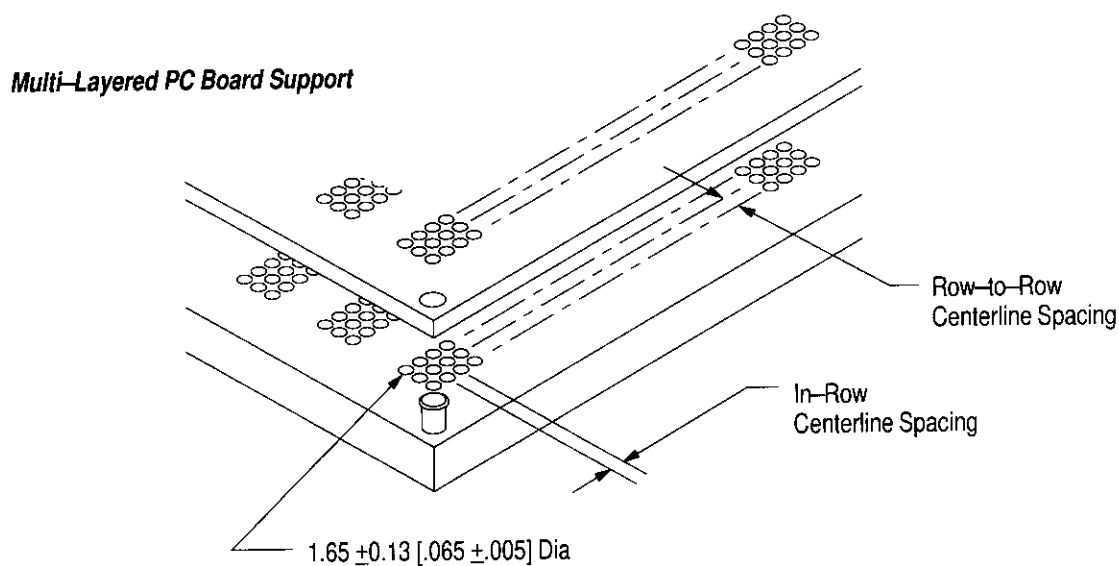
A pc board support (customer supplied) must be used for the seating of connectors. While many materials can be used for this, steel or cast aluminum is recommended.

### A. Multi-Layered PC Board Support

A flat-plate type support should be used with multi-layered pc boards having internal circuitry. For details, see Figure 14.

### B. Single-Layered PC Board Support

An anvil type support may be for use with single-layered pc boards. See Figure 14.



### Single-Layered PC Board Support

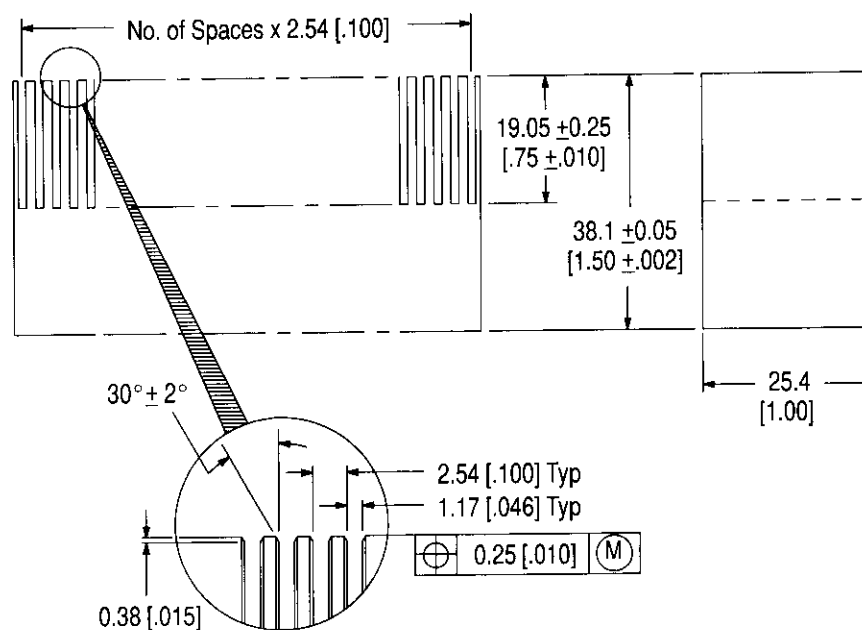


Figure 14

### 5.3. Seating Tool

Seating tools must be used in manual or power assist units with sufficient ram surface and the capability of applying insertion force per contact. The seating tools align the components for proper seating and are specifically designed for the different types of Eurocard connectors. AMP seating tools, connector types, and instruction sheets are shown in Figure 15.

### 5.4. Pushing Plate

A pushing plate (customer supplied) must be used to seat vertical receptacles with ACTION PIN thin stock contacts in connectors that do not require special tooling. The pushing plate must be of minimum length and width equal to full top dimensions of the receptacle. The larger the pushing plate, the less critical the alignment during seating. When seating connector, the pushing plate must move in a straight, vertical line, and its bottom surface must be parallel to the top of the pc board support or template when force is applied. See Figure 15.

#### NOTE

*The force used to seat Eurocard connectors with square stock contacts shall not exceed 177.93 N [40 lbs] per contact. Seating force for connectors with ACTION PIN thin stock contacts shall not exceed 88.96 N [20 lbs] per contact.*

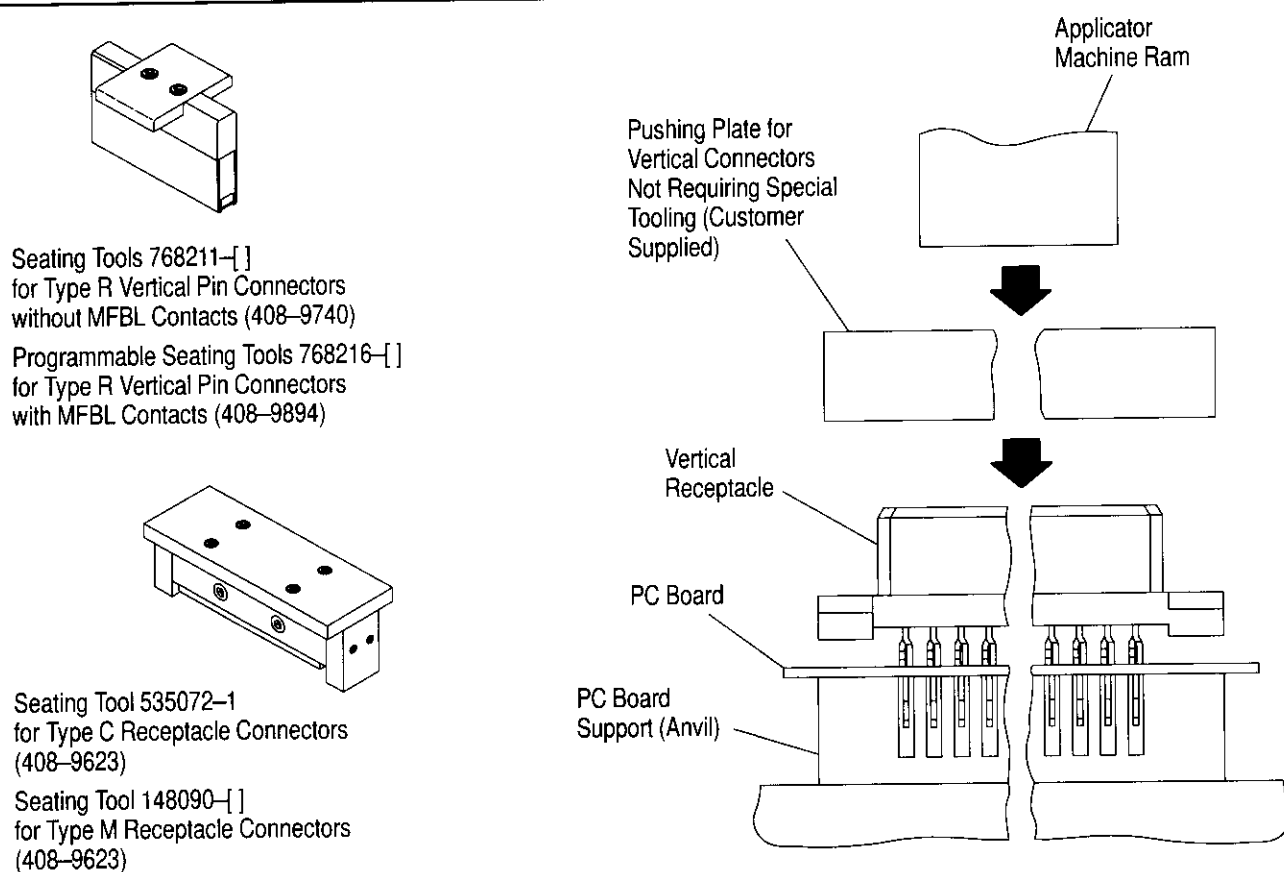


Figure 15



### 5.5. Connector Replacement Tooling

When entire Type C receptacle connectors and Type R pin connectors must be replaced, Eurocard Connector Removal Tool Kit 534611-1 should be used. Refer to Figure 16 and proceed as follows:

**CAUTION**

*DO NOT use this tool in a power assist unit. This procedure should be done with a manually operated unit only.*

1. Place support block with slot up on the arbor frame support base.
2. Place housing down on support block with pins extending up through pc board.
3. Slide guide block over wire-wrap tails. Be sure the "T" stamp on end of guide block is away from pc board.
4. Start push-out assembly into guide block, using care not to damage pins.
5. Lower the arbor ram onto the center of push-out assembly and apply force until it is seated on guide block.
6. Raise the arbor ram and remove push-out assembly and guide block. When the board, the connector, and the support block are removed, the connector will fall away with pins removed from the pc board and housing.

### 5.6. Contact Extraction Tooling

Extraction tooling is available for withdrawal of individual power contacts and coaxial contacts from Type M connectors. The tip of the tool is inserted into the contact cavity from the mating side of the housing. The contact is forced out of the rear of the housing by pushing the tool handle. See Figure 16.

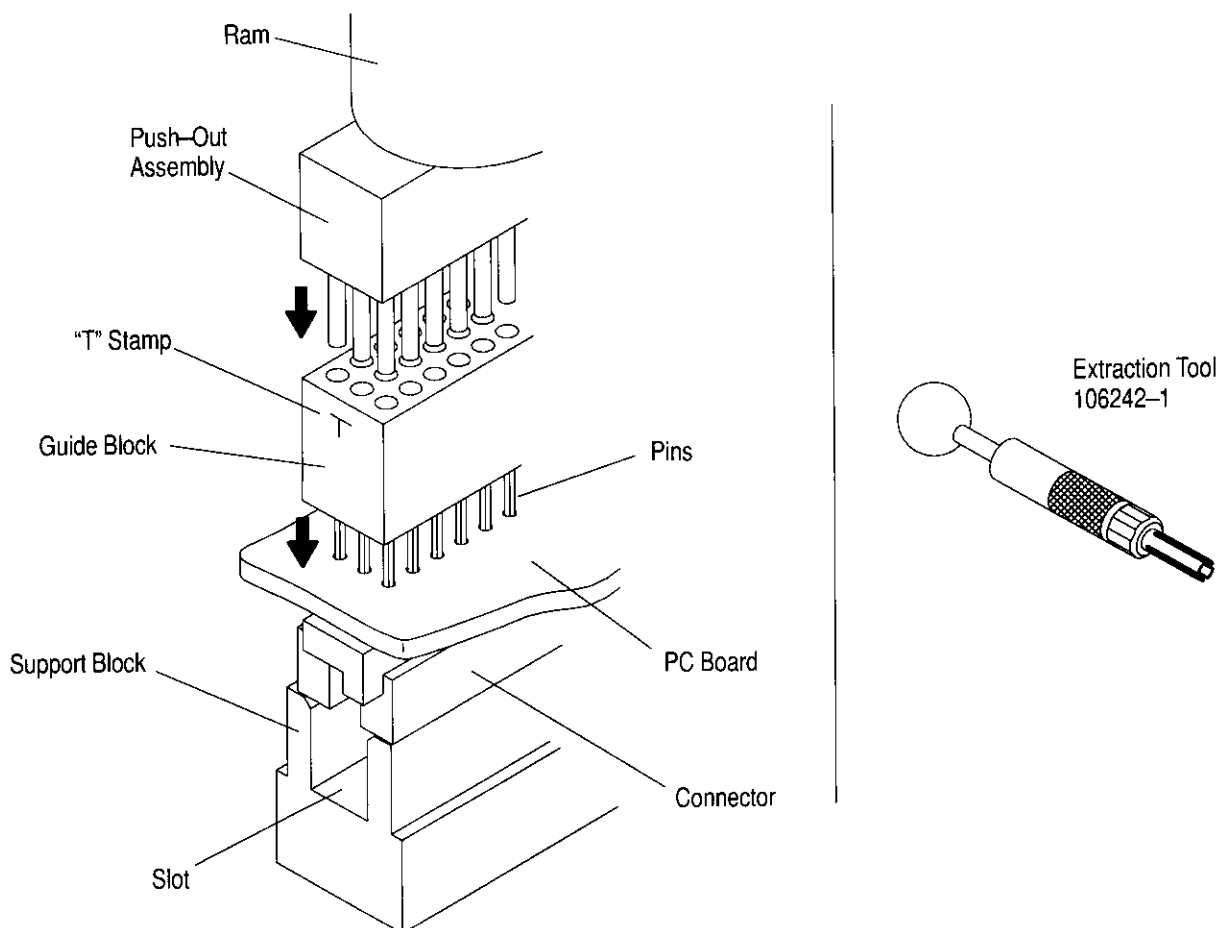
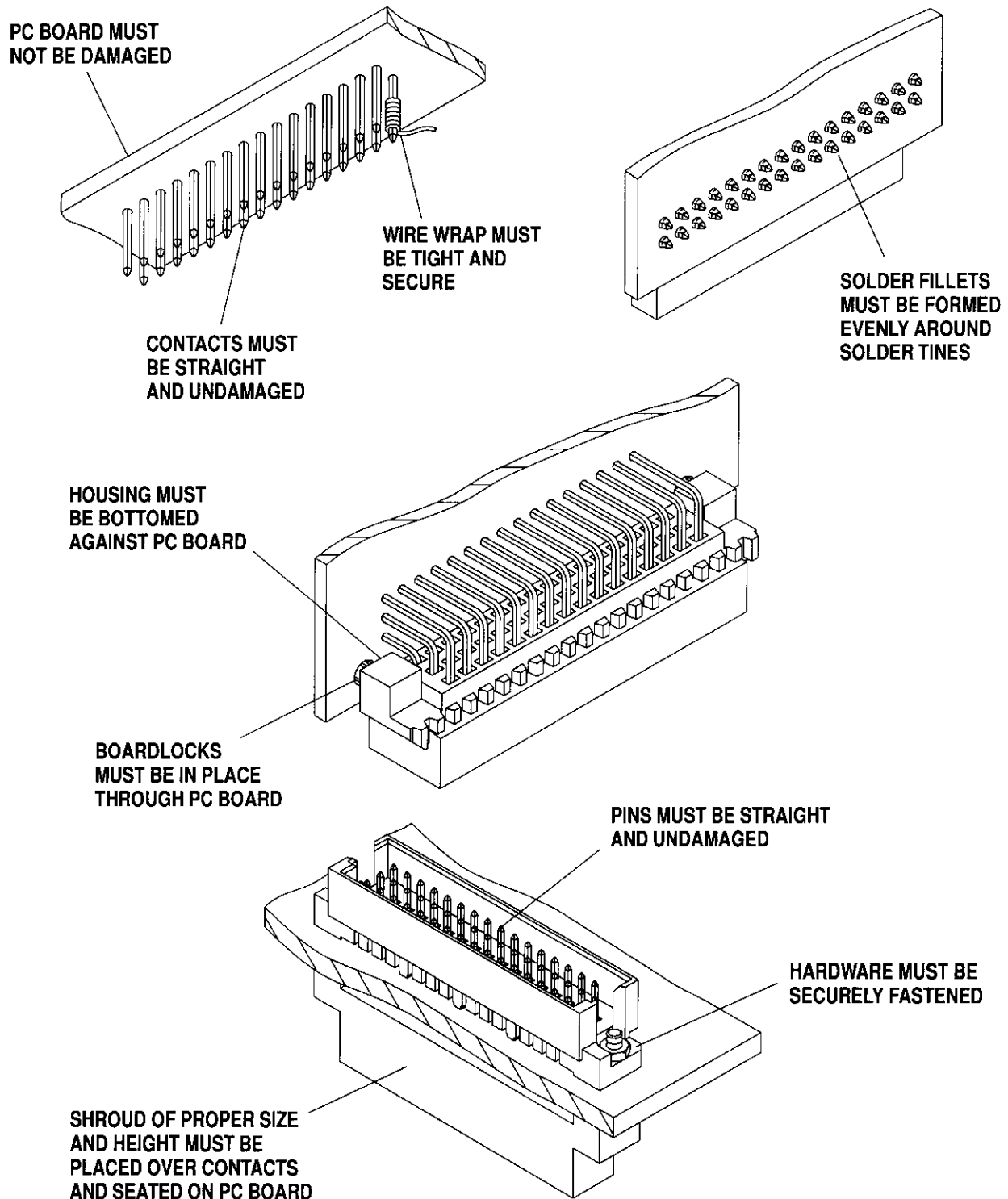


Figure 16

## 6. VISUAL AID

The following illustration provides features that will help an assembler recognize a good installation. For dimensional inspection refer to the preceding pages of this specification.



**FIGURE 17. VISUAL AID**